THE PENNY MAGAZINE

OF THE

Society for the Diffusion of Useful Knowledge.

111.] PUBLISHED EVERY SATURDAY. [DECEMBER 28, 1833.

QUINTIN MESSYS, OR MATSYS.

The Misers, at Windsor Castle: by Quintin Messys, or Matsys.

IN the state apartments of Windsor Castle is the celebrated picture called 'The Misers,' by Quintin Matsys, the Blacksmith of Antwerp. This picture invariably arrests the attention of visitors. The brilliancy of the colouring, the strong characteristic expression of the two old men, and the minute accuracy of all the objects by which they are surrounded, afford a pleasure which is sometimes not created at first by the productions of a

higher species of art, which demand attentive examination and some degree of knowledge. Everybody can judge of a painting which aspires only to be a faithful representation of some familiar scene. 'The Misers' are probably portraits of two money-changers or bankers of the days of the painter; who are amicably employed in counting over their coins and jewels—not with the careworn self denial of the 'miser,' but with a joyous satisfaction, such as thriving citizens might reasonably feel. The spectator also takes a new interest in this painting, from the traditionary story connected with it, which we shall notice in the following brief memoir of the artist.

The name of this Flemish painter is given in a great variety of forms by different authorities. In this country he is commonly called Matsys; he was born, it is believed, at Antwerp, although some say at Louvain, in 1460. His history is romantic and interesting. All the accounts agree that he was bred to the business of a blacksmith or farrier; and hence he is often designated the Blacksmith of Antwerp. It is said that he followed this occupation till he was twenty years of age, if not older. We then have different stories as to the circumstances connected with his relinquishment of the sledge-hammer and the anvil for more easily-wielded instruments of design. We may observe, that an academy for the cultivation of painting, and the other fine arts, had been established in the city of Antwerp in 1454; and that it is recorded to have had the effect of awakening, throughout the Netherlands, a strong interest in these pursuits. According to one account, Messys showed a decided inclination and talent for design when a child, and would have chosen the profession of a painter if his father had permitted him, or had possessed the means of procuring for him the requisite instruction. His strength was hardly equal to the severe labour of the business to which he was actually bred; and at last, it is said, his exertions brought on a dangerous illness. It is admitted, that either this or some other cause gave him reason to apprehend that he would not be able to gain his bread by the trade he had learned. In these circumstances he scarcely knew what to do, and gave way to considerable despondency. But what seems a misfortune, and is felt as such at the time, is often fraught with results which more than compensate for the temporary pain or inconvenience it occasions. In the hospital to which he was taken, Messys amused himself, during his convalescence, by sketching different objects in pencil. A friend, to whom he one day showed these attempts, was struck with something in them which seemed to him to indicate a genius for such performances; and, flattered and excited by this commendation, Messys renewed his efforts, and persevered till he gradually acquired facility and superior skill. Another account, which however does not seem to be inconsistent with this, makes him to have given the first public evidence of his ability in his new art, by the fabrication of a number of little figures in imitation of the rude wooden images which used to be distributed among the people by the members of one of the hospitals in Antwerp, as they walked in their annual procession. The figures which Messys produced were at once acknowledged by all to be far superior to any they had been accustomed to see; and the demand for them furnished him with occupation for a short time. It was probably after this that he executed the iron-railing, or rather cage, over a well near the great church of Antwerp, which is still to be seen; and also an iron balustrade for the college of Louvain,—both works of great merit. But even these performances, exercises of ingenuity and fancy as they were, might still be considered as not altogether beyond the range of his original employment. He had not yet abandoned working in iron; and therefore there may be truth in the story which assigns a particular cause for his eventually becoming a painter. A mutual attachment, it is said, had grown up between the blacksmith and the daughter of a painter of Antwerp, who was resolved, however, to bestow her upon a young man of his own profession. Messys determined to make an effort to place himself on a level with his rival in the point which had regulated the father's preference; and the result was that he produced a picture, with which the father was so much struck, that he changed his intention, and made the lovers happy by at once consenting to their union. In allusion to this incident, some verses under a portrait of Messys, describe him as having been transformed by love from a Vulcan into an Apelles; but some writers have been disposed to contend that the verses in question, which were not written till about a century after the time of the painter, are probably the only foundation for the story. At the same time, it would seem difficult to account for the author of the verses having expressed himself in the manner he has done, had he not gone at least upon some tradition similar to that now mentioned.

Be the origin, however, of his devotion to art what it may, Messys became in time a very distinguished painter,—the most distinguished indeed which his country produced in that age. He painted numerous pictures, of the merits of some of which, several of the best critics, and among others Sir Joshua Reynolds, have spoken in terms of warm admiration. Sir Joshua says that in his greatest performance, the Descent from the Cross, there are heads that have not been excelled by Raphael. Messys never was in Italy, and it has been thought that his genius failed to develope itself in some respects as it might have done for want of this advantage. His manner is forcible, but somewhat hard and dry—a defect which might possibly have been removed, had he enjoyed an opportunity of studying the works of his great Italian contemporaries, in which truth of nature is so finely combined with, and irradiated by, the spirit of poetry and beauty.

The picture of which our wood-cut is a copy has been always considered one of the most successful, as well as characteristic performances of this painter.

Messys is also said to have been the artist who wrought the iron-work of the tomb of Edward IV. in the choir of St. George's Chapel at Windsor. He appears in his own day to have been well known in England, and is spoken o with much admiration by Sir Thomas More in one of his Latin poems. He died in 1529, and left a son named John, who followed the same profession, but never attained the excellence or the reputation of his father.

THE EMIGRANTS.

WHERE the remote Bermudas ride
In the Ocean's bosom, unespyed,
From a small boat that rowed along,
The list'ning winds received their song:

"What should we do, but sing His praise
That led us, through the watery maze,
Unto an isle so long unknown,
And yet far kinder than our own!

Where He the huge sea-monsters racks,
That lift the deep upon their backs;
He lands us on a grassy stage,
Safe from the storms and prelates' rage *.

He gave us this eternal spring
Which here enamels every thing,
And sends the fowls to us, in care,
On daily visits through the air.

* The Emigrants whom the poet describes were dissenters from the Church of England, when the tolerant spirit of later times had not been called into action.

He hangs in shades the orange bright,
Like golden lamps in a green night,
And in these rocks for us did frame
A temple where to sound His name.
Oh! let our voice His praise exalt
Till it arrive at Heaven's vault,
Which then, perhaps, rebounding may
Echo beyond the Mexique Bay."
Thus sung they in the English boat
A holy and a cheerful note;
And all the way, to guide their chime,
With falling oars they kept the time.

ANDREW MARVELL, Died, 1678.

MANUAL ALPHABETS.

IN laying before our readers a representation of the manual alphabets, respectively in use in this country and on the Continent—which we think may be of practical use to some, and not without interest to many—it seems desirable to explain what they are, to state the purposes to which they are applicable, and to give an account of their origin so far as it can be ascertained. For the means of doing this we are considerably indebted to the memoir of the Abbé de l'Epée in the 'Biographie Contemporains,' and to an article on the subject in a recent number of the 'Magasin Pittoresque.'

The pretensions of the manual alphabets have been much misunderstood and frequently overstated. If we had not met with grave and eloquent essays, which give to dactylology (a name derived from the Greek, meaning finger-talking,) the power of conducting the dumb to the gradual attainment of speech, we should think it scarcely requisite to state that it is merely a substitute for, or rather, a mode of writing; with no other advantage over the use of pen, ink, and paper, that we are aware of, than this—that the apparatus is always at hand, always ready for use. By the means of the manual alphabet all the words and phrases of conversation can be expressed. To learn it requires less than half an hour, and the practice of a few days makes the use of it easy and expeditious. With the following engraving before him, no person can find difficulty in teaching himself.

In the one-hand alphabet the letters J and Z are figured in the air; J with the little finger, and Z with the index. In the other, the letter H is formed by dashing the palm of the right hand across that of the left. The other characters do not appear to need explanation. It is very unnecessary to mark the points otherwise than by a proper pause in the manual action. But it is requisite that the words should be separated, either by a very slight pause, by a horizontal motion of the hand from left to right, or by a sort of fillip with the finger and thumb of the right hand.

On comparing the two alphabets, we find that the object of both is to represent, as nearly as possible, the usual forms of the letters—the double-handed alphabet imitating the capitals, and the other the small letters. The single exhibits an anxiety not to require the help of the left hand; and the other is unwilling to dispense with its assistance. The single tortures the fingers, in order to screw them into some fancied resemblance to the written character; and we see that, after a lame attempt to form X with one hand, it admits another, formed with two, as a variety. The other often chooses to do with two hands what one would do better; so, to match with the X in the single alphabet, there is Q in this. A very good letter is formed with one hand, but a variety is introduced as if to show that it could be done with two. C and J remain the only letters which two hands could not be made to represent; and the former is the same in both alphabets. The highly anomalous and awkward variety of Z, seems to have been devised for no other reason than to obtain a resemblance to the written form. We are disposed to consider that, taking either one or both hands throughout, forms much more convenient and easy might be devised if the object of resemblance were altogether relinquished. But taking them as they stand, the characters made with two hands are much more distinct, and more easy to form and decypher than the other. There is also this advantage in the two-handed alphabet, that it presents the only conceivable mode of communicating with the deaf in the dark; for the characters being formed *by* one hand *upon* the other, it is only necessary with the right hand to form the letters upon the left of the person addressed. We are informed by Mr. Watson of the Kent Road Asylum, that the pupils in that institution, who have sufficient knowledge of language to use the manual alphabet at all, can, in this manner, converse with great facility by night.

Although the two-hand alphabet is much the best known in England, our information concerning the other is far more distinct. The latter certainly came from Spain, where also the art of instructing the deaf and dumb seems to have originated. The subjects are, indeed, so much connected, that it would be useless to attempt to keep the consideration of them entirely separate. It is a vulgar mistake to assign a French origin to those useful arts. The Abbé de l'Epée could well afford to spare the honour of the original discovery, if the assertion of an eloquent writer be true, that "He is not the first discoverer of any art who first says the thing; but he who says it so long, and so loud, and so clearly that he compels mankind to hear him*." Of the manual alphabets the Abbé certainly was not the inventor; and the impression that he was such may perhaps have arisen from the circumstance that his tomb-stone, in the cemetery of Père la Chaise at Paris bears the figure of an open hand.

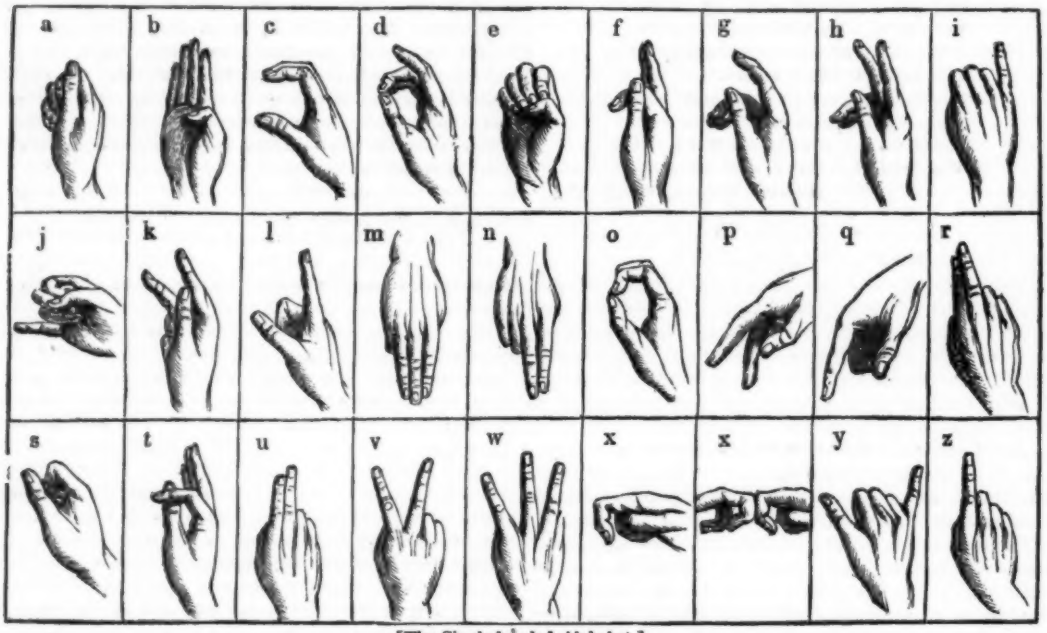
If it were not also ascertained that the art of instructing the deaf and dumb originated in Spain, our knowledge that manual alphabets were first known in that country might have led to the supposition that they were originally designed for the purposes of secret communication. But our better information allows us to assign to the invention a benevolent and useful object; as it is known that this mode of communication entered into the system by which the dumb were taught to speak.

Father Ponce, a Benedictine monk of the monastery of Ona in Spain, who died in 1584, appears to have been the first who exercised the art of instructing this unfortunate class of beings; but we are unacquainted with his method. Don Juan Paolo Bonnet published, in 1620, a book in which he developed the principles by which he had been guided in the education of the constable of Castille, who had become deaf at four years of age; but who, under Bonnet's instruction, learned to speak his native language with much distinctness. Bonnet was emulated—it is not clear we should say imitated—by Digby, Wallis and Burnett, in England; Ramirez of Cortono; Petro de Castro of Mantua; Conrad Amman, a Swiss physician practising in Holland; Van Helmont, and many others.

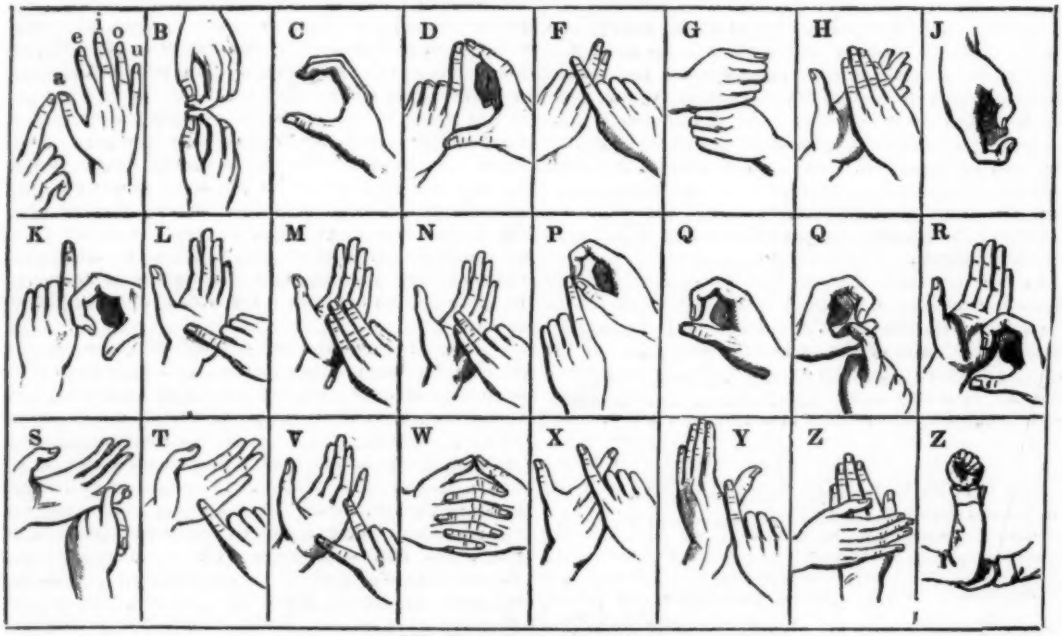
It appears strange that, notwithstanding this, the possibility of instructing the deaf and dumb seems to have been so little suspected in France, that Don Antonio Pareires, who settled in Paris about the year 1735, was encouraged by the general ignorance to claim the honour of the discovery for himself. He made a great mystery of the means he employed; but his claim was allowed by the Academy of Sciences. Some years after, another professor of the art, one Ernaud, set up a rival claim, published a book, and solicited and obtained from the Academy the same honour which had

* Edinburgh Review.

been granted to Pareires. It seems that under all the systems of instruction previous to that of De l'Epée the pupils were considered to have attained perfection when they had been brought to pronounce with more or less facility, and, often with much pain and difficulty, certain number of phrases; and, in obtaining this result, the finger-alphabet was much employed by the teachers of the Spanish school.



[The Single-handed Alphabet.]



[The Double-handed Alphabet.]

The one-handed alphabet seems to be particularly distinguished as the manual alphabet of the Spaniards. It is said to have been introduced into France by Pareires, and the Abbé de l'Epée is stated to have borrowed it from him, having only before known the two-handed alphabet. But another account, which, as the most authentic, we shall give, declares that the Abbé obtained a knowledge of the alphabet from a Spanish book.

On one of the days which the Abbé was in the habit of employing in the instruction of his pupils, a stranger came and offered to his acceptance a Spanish book, with the assurance that a knowledge of its contents would be of much service to him in his laudable undertaking. Being ignorant of the Spanish language, the Abbé at first declined the offered present; but having opened it at hazard, he perceived the manual alphabet of the Spaniards, and then, turning to the title-page, he read the words—*Arte para ensèmar à hablar los mulos.* "I had no difficulty," says the Abbé, "in divining that this signified *the art of teaching the dumb to speak*; and from that moment I determined to learn the language, that I might be of service to my pupils."

From the schools of the Abbé the use of the alphabet extended to nearly all the institutions for the instruction of the deaf and dumb on the Continent, and in the

United States. The use of it is very limited in this country.

Among themselves, the instructed deaf and dumb use almost exclusively the language of *signs*, and have recourse to the manual alphabet only for the expression of proper names, or of such technical words as have not yet been characterised by a specific sign. But in communicating with those who are unacquainted with their system of signs, they habitually use the alphabet. In conversing thus with them it is not always necessary to form entire phrases. The principal words suffice to fix the attention, and a natural gesture completes the thought. Yet it must be admitted that, in the endeavour to catch ideas which are only partially expressed, they are often exposed to very curious and sometimes very provoking mistakes.

As all the deaf and dumb who have received the usual instruction are acquainted with the use of the manual alphabet, it seems almost incumbent on those who have any intercourse with such, or with others who cannot benefit by vocal communication, to acquire this useful and simple art.

MINERAL KINGDOM.—Section 21.

COAL.

The annual consumption of coals in Great Britain must be enormous; but there are no means of ascertaining the amount with anything approaching to accuracy, because no account, accessible to the public, is kept of by far the largest amount consumed. By the duties levied on coals carried coastwise, and by the returns to parliament laid before special committees, we obtain some correct data; but the amount stated in these is but a small part of the coal raised throughout Great Britain. In the evidence before the committees of the Lords and Commons, in 1829 and 1830, we have some calculations by two eminent civil engineers, Mr. Buddle and Mr. Taylor. Mr. Buddle says, "The calculation which I have made of the consumption of England and Wales is as follows: manufactories, 3,500,000 London chaldrons; household consumption, 5,500,000, making 9,000,000 in all, consumed from inland collieries: the quantity sent coastwise, on both sides of the island, is 3,000,000; together 12,000,000 chaldrons." As a London chaldron is nearly 27 cwt., that quantity is equal to about 16,200,000 tons weight.

Mr. Taylor's estimate of the consumption of coal in Great Britain is given in the following form:—

	Tons.
The annual sale of coals carried coastwise, from Durham and Northumberland, is	3,300,000
Home consumption, say one-fifth	660,000
Total	3,960,000
Which quantity supplies about 5,000,000 persons; and, supposing the whole population of Great Britain to be 15,000,000, this must be trebled	11,880,000
Consumed by iron-works, say 600,000 tons of metal, to produce which requires at least four times the quantity of coal in making even pig-metal; and the extraordinary consumption in the mines of Cornwall, &c.	3,000,000
Consumed in Great Britain	18,840,000
Exported to Ireland, say	700,000
Total tons, exclusive of Foreign Exportation	19,540,000

Thus Mr. Buddle gives a larger amount for the consumption of England and Wales alone than Mr. Taylor does for the whole of Great Britain, and including a part of the consumption of Ireland.

The export of coals from the Tyne and the Wear amounted, in 1828, to about 3,200,000 tons, and the consumption on the spot to about 660,000 tons. Thus the total annual sale of coals from the Newcastle and Durham coal-fields is probably not much under four millions of tons.

So vast a consumption leads naturally to the inquiry, "what, at this rate of annual excavation, will be the probable duration of this coal-field?" This question occupied a great deal of the attention of the Committees of both Houses of Parliament, already spoken of, and there was a very wide difference in the answers which they received. Mr. Taylor was asked by the Lords' Committee if he had formed any calculation of the extent, produce, and duration of the Durham and Northumberland coal-fields; and he replied, that he had endeavoured to do so, and gave in the following statement; which he said, however, was only to be considered as an approximation.

	sq. miles.
He estimates the Durham coal-field, south of the Tyne, to embrace an area of	594
The Northumberland Field	243
	837
And he considers that of this there had been excavated	105
Leaving, in 1829	732

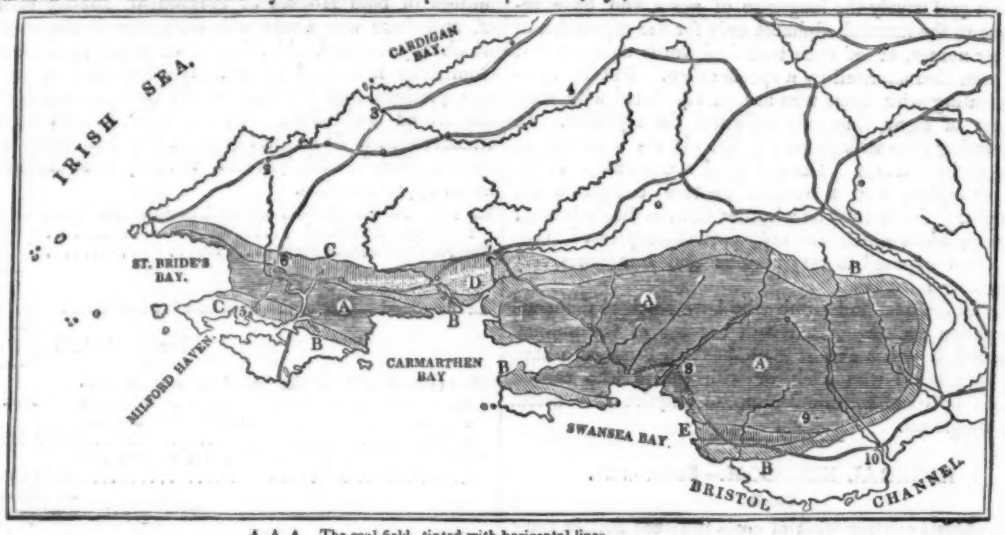
	Tons.
Then estimating the workable coal strata at an average thickness of 12 feet, the contents of one square mile will be 12,390,000 tons, and of 732 square miles	9,069,480,000
And deducting one-third part for loss in working, and from disturbances in the strata	3,073,160,000
There remain	6,046,320,000

This very comfortable and consolatory view of our own condition, and of that of our distant posterity, as regards this valuable commodity, is, however, a good deal disturbed by the opinions of Dr. Buckland and Mr. Sedgwick, the professors of geology at Oxford and Cambridge. Dr. Buckland being asked whether he considered the estimate of Mr. Taylor correct, answered that he thought it much exaggerated. Mr. Sedgwick is also of opinion that Mr. Taylor's estimate is too great; and both professors state the same reasons for differing so widely from the views of Mr. Taylor. He has assumed that there is a continuous thickness of twelve feet of workable coal over the whole area of 732 square miles; but all experience, both of this coal-field and of every other, is unfavourable to this assumption, for not only are the coal-seams extremely variable in thickness, but they are equally so in quality, as we have already shown. The opinions of the learned professors are confirmed by another scientific observer, Mr. Bakewell, who, in his 'Introduction to Geology,' discusses this question, and calculates that the coal-field now under consideration will not last above 360 years. All these calculations, however, have reference only to the best qualities of coal,—to those which can be raised at an expense sufficiently low to enable them to be sold at a remunerating price, in competition with other coals.

It appears to be very clearly made out that all those parts of the country which are now supplied with fuel from the Northumberland and Durham mines will continue to enjoy that advantage for the next 400 years; and those who are not so selfish and unpatriotic as to be indifferent to the fate of their posterity after the year 2233, will learn with satisfaction that as far as England's prosperity is connected with an abundant supply of coal, there is no danger of its sustaining any check for a much more extended period, as there is a store in reserve far greater than there was in the whole of the north of England field before a single fire was lighted by its produce. This extensive repository is in the coal-field of South Wales.

The geographical position of this vast deposit of the coal-measures will be seen by the annexed Map. It lies in a great basin of the carboniferous limestone (O. diagram in No. 51, 19th January), which rises from under the coal strata nearly all around the limit of the coal-field. In a part of Pembrokeshire, the limestone is wanting, and the coal strata rest upon slate (Q) which is inferior to the limestone, and, near Narbeth, they are in contact with the old red sandstone (P) which lies between

the slate and the limestone. In a part of the southern boundary in Glamorganshire, the coal-measures are separated from the limestone by a detached deposit of strata of posterior formation to them, and therefore lying upon them, viz., new red sandstone (K), and lias limestone (I. *f.*).



A, A, A. The coal-field, tinted with horizontal lines.
B, B, B, B. Limestone, tinted with lines sloping to the right.
C, C. Slate, tinted with perpendicular lines.
D. Old red sandstone, tinted with dotted lines.
E. New red sandstone, tinted with perpendicular waving lines.

1. St. David's. 2. Fisgard. 3. Cardigan. 4. Lanbedr. 5. Milford. 6. Haverfordwest. 7. Carmarthen. 8. Neath. 9. Llantrissent. 10. Cardiff.

The coal-measures do not lie horizontally within this limestone basin, but in a trough shape, being deepest towards the middle, and rising up towards the outer limits, the ends of the several strata *cropping out*, as the miners term it, that is, appearing successively at the surface. They do not, however, form one uniform sweep or inverted arch; for there has been a partial upheaving of the strata, so that a section across the field from Bridgend, due north, would present the following appearance:—

There are thus two basins, the one lying to the north, the other to the south of a high ridge *a*, which runs from Aberavon, half a mile north of the Avon, by Cefn Eglwysillan, two or three miles north of Caerphilly, a little beyond which it disappears. In the northern basin, which is by far the most extensive, the strata are much less inclined than in the southern basin; for in the former the dip of the strata is generally under 10°, while in the latter it is often 45° and upwards. The whole coal-field is traversed by *dikes* or *faults*, generally in a north and south direction, which throw all the strata from 300 to 600 feet up or down. The nature of these faults we have explained in Section 16. On the western termination of the basin, in St. Bride's Bay, the strata exhibit the most extraordinary marks of confusion and derangement, being vertical and twisted in every possible direction.

The extent of this coal-field, and the thickness of the seams, have been variously stated by different authors; but the estimate which is perhaps the most to be relied upon, is that of the Rev. William Conybeare, the eminent geologist, who has long resided in the country, and is perfectly familiar with its geology. It is contained in a letter addressed by him to Henry Warburton, Esq., M.P. published in the Report of the Committee of the House of Commons, already often referred to. Mr. Conybeare makes three great divisions of the coal-seams; the lower, middle, and upper series, and he assigns to them, respectively, the average thickness of thirty-five, fifteen, and ten feet, making altogether sixty feet of workable coal. Martin, who described this coal-field, makes them amount to ninety-five feet; and Mr. Conybeare thinks that Martin does not overstate the amount, provided all the seams be taken into the account. But Mr. Conybeare's calculation only includes the workable coals, and he considers that those seams cannot be worked with profit where it is necessary to go lower than 200 fathoms, or 1200 feet, for beyond this the expense of drainage, &c., becomes enormous. Keeping the same considerations in view, Mr. Conybeare makes the following estimate of the area occupied by the coal-seams:—

For the Lower Series,	525	square miles, at	35 feet thick.
„	100	„	17 „
Middle Series,	360	„	16 „
Upper Series,	64	„	10 „

This, it is calculated, after deducting one half for loss and for what has been already worked, will amount to about 11,423,750,000 tons; and taking the annual consumption of all England at 15,000,000 of tons, the provision of good coal in the South Wales Basin is sufficient for 760 years. Taking all that remains in the Northumberland and Durham coal-fields, and all the other coal-fields of England together at three times that amount, and which we are inclined to think would not be an over-estimate, we have a supply of good coal, which, at the present rate of consumption, would last above 3000 years: how long beyond that time the inferior seams will yield a supply of fuel, we shall leave posterity to calculate.

We have hitherto spoken only of the coal-fields of England, and have taken no notice of the large deposits which exist in Scotland. These, although very productive, are confined to a very limited space. Nearly all the valuable mines are in the Low Country, between the Highlands on the north and the range of slate mountains which run in a north-east and south-west direction across the island, in the south of Scotland. The capital is very abundantly supplied with excellent qualities of coal brought from a distance of only a few miles, and delivered in Edinburgh at from nine to twelve

shillings per ton. Glasgow is surrounded with collieries, and is supplied at even a cheaper rate than the capital; and to this profusion of fuel not only Glasgow but Paisley, and the neighbouring great manufacturing towns owe, in a great degree, their origin and prosperity. The mines in the counties of Fife and Clackmannan also produce very fine qualities of coal.

The coal formation of Scotland is found in the county of Antrim, on the opposite coast of Ireland; and the two were probably at one time continuous, for there are not only indications of the coal-measures in the intermediate islands, but there are many other circumstances connected with the geology of the two countries, which almost amount to decisive proof that Ireland and Scotland were at one time united. The collieries of Ballycastle, on the north coast of Antrim, were formerly considerable, sending from ten to fifteen thousand tons to market yearly; but they are now greatly fallen off. A very extraordinary discovery was made at these collieries about the year 1770: the miners unexpectedly discovered a passage cut through the rock, which was very narrow, owing to incrustations formed on its sides; but, on being sufficiently widened, some workmen went through it, and found that it led to a gallery which had been driven forward many hundred yards into the bed of coal. It branched out into thirty-six chambers, where the coal had been worked out in a regular manner, pillars being left at proper intervals to support the roof. Some remains of the tools, and even of the baskets, used in the works were discovered, but in such a decayed state that, on being touched, they fell to pieces. There does not exist the most remote tradition of such a work in the country; and its great antiquity is proved by the sparry incrustations on the sides and pillars of the mine, for, in such a situation, a very long period would probably elapse before these would be deposited. (See 'Hamilton's Letters on Antrim.') In the eastern part of the county of Tyrone, at Coal Island and Dungannon, a coal-formation occurs associated with that variety of limestone which is usually found underlying or alternating with the coal-measures in Scotland and England.

But coal has been discovered in greater or less quantity in seventeen counties of Ireland. The coal district of the province of Munster, according to Mr. Richard Griffith, an experienced geologist and practical engineer, is greater in extent than any in England, and probably contains, he says, almost inexhaustible beds of coal. It extends over a part of the county of Clare, over a considerable portion of the counties of Limerick and Kerry, and a large part of the county of Cork. But none of the coal-beds of this province, with the exception of those in the county of Clare, belong to the same geological period as the coal-fields of England and Scotland: in place of lying above the carboniferous limestone (O. diagram in No. 51, 19th of January), they lie under it, and are interstratified with the old slate rocks (A), the lowest in the whole series of the secondary strata. The quality of the coal too is quite different from either the English or Scotch coal, being that variety called anthracite, which burns without flame, and approaches to the nature of charcoal. It is chiefly used for burning the limestone of the adjoining districts; and the most considerable collieries, those of Dromagh, have yielded 25,000 tons per annum, at from ten to fifteen shillings per ton. The district of Clare belongs to the true coal-measures (M), but they are chiefly the shales, sandstones and sandy slates, coal being of very rare occurrence, as far as discoveries have yet been made, and when found, it is of very indifferent quality. Mr. Griffith is of opinion that coal of a bituminous quality is very extensively distributed over the eastern part of the province of Connaught, particularly in the counties of Leitrim and Roscommon; but little is as yet known with respect to the number and thickness of the seams, or the facility of working them. In the province of Ulster, besides the collieries in the counties of Antrim and Tyrone already mentioned, coal has been met with in the counties of Fermanagh, Monaghan, and Cavan, but not to any great extent. The province of Leinster contains the true coal-measures, lying above the carboniferous limestone, in the county of Carlow, and in Queen's county, and in the county of Kilkenny, from whence it stretches some way into the county of Tipperary. The great deposits are around Castlecomer in Kilkenny, and Killenaule in Tipperary, and both these have been extensively worked; but according to Mr. Weaver, in his account of the Killenaule district, the coal, not only of that field, but that of the other portions of the Leinster coal-tract, is wholly of the nature of anthracite, and of a thin stratified structure.

Coal is found in many parts of the continent of Europe. One of the most considerable deposits is that of Belgium, where, in the province of Liege, the coal-formation extends from Thon near Namur to the confines of the province of Limburg, along the Meuse for thirty-three miles, and with a breadth of about eight miles. Continuing in a north-east direction from Liege, we find another coal-field between Aix-la-Chapelle and Dusseldorf, the principal collieries being in the neighbourhood of Eschweiler. The coal is of excellent quality, and is extensively worked. Farther on, in the same direction, we come upon a very extensive coal-field in the valley of the river Ruhr in Westphalia. It is above thirty-five miles in length and seventeen in breadth, and the measures contain above one hundred and sixty different seams of coal, varying in thickness from six inches to seven feet, of which about eighty are worked.

Coal has been found in many other parts of Germany, particularly in Saxony, Bohemia, and Upper Silesia; and in those places it is almost invariably surrounded by manufactories. It has been found in more than thirty departments of France, but has been comparatively little worked. Coal is also abundant in the United States of North America. On the eastern side of the Appalachian system of mountains, the coal-formations are found only in the northern States; but, on the western slope, there is every reason to suppose that it exists over the greater part of the country between the Central Mountains and the Mississippi. The most celebrated mines at present worked are those near Pittsburg, in Pennsylvania.

THE ICHNEUMON.

The animal, which forms the subject of this article, was held in high respect by the ancient Egyptians, to whom it appeared to represent a benevolent power incessantly employed in the destruction of the reptiles, always annoying and often dangerous, with which warm and humid climates abound. To the destruction of such animals, the ichneumon seems incited by his instincts and destined by his means; but it is not by actual attack, but by the destruction of their eggs, that he represses the numbers of such creatures as the crocodile, the larger serpents, and the great lizard. The ichneumon, from its smallness, has not even the power to overcome his enemy the tupiramhis, an animal of habits very similar to his own; he is, moreover, not a very carnivorous animal, and his great timidity prevents him from capturing any animal capable of opposing a positive resistance. Impelled by necessity, and directed by much prudence, he is seen towards evening to glide between the inequalities of the ground, watching the least appearance, and fixing his attention on whatever strikes his senses, with the view of reconnoitering any danger, or of discovering prey; but where there is the least appearance of hazard he will neglect the calls of appetite

Besides eggs, the food of the ichneumon is chiefly

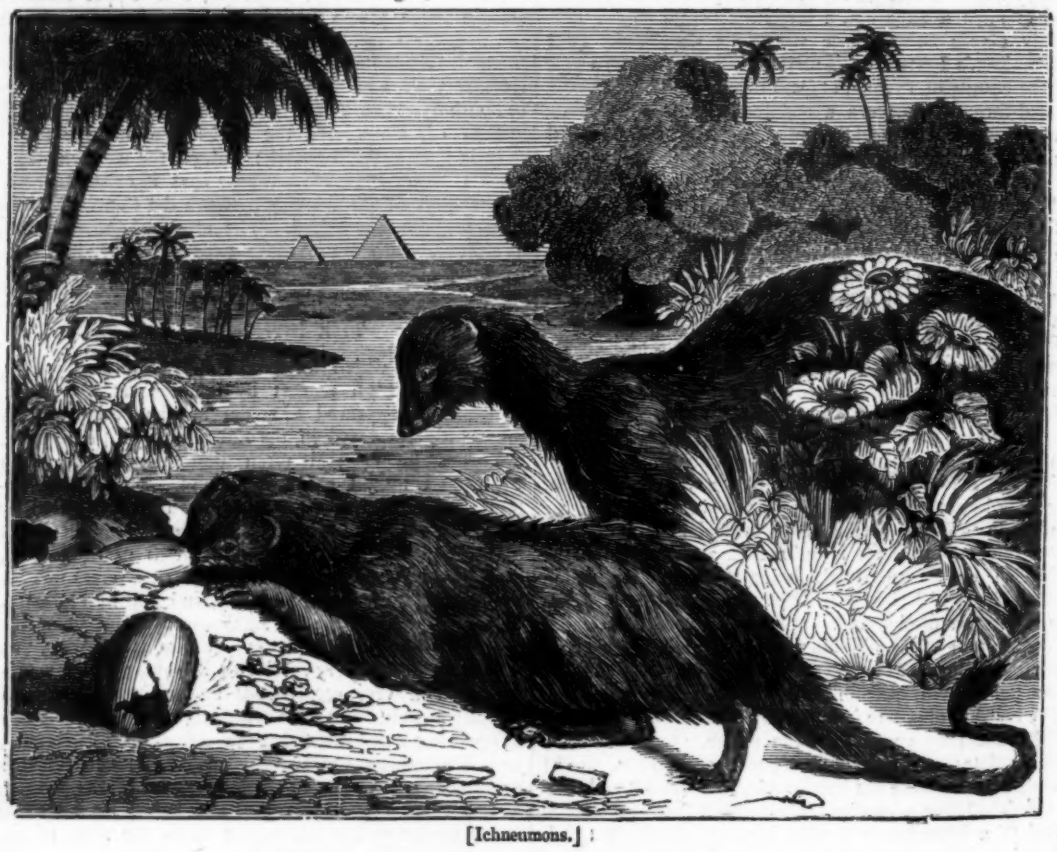
rats, small serpents, and birds. During the inundation he approaches the villages and devastates the poultry-yards; but being thus brought into contact with the fox and the jackall, he often becomes their prey. Like the pole-cat, he destroys all in the poultry-yard to which he gains access, or all the young which he can surprise at a distance from their mothers. But above all other food he searches for eggs, of which he is very fond, and it is thus that the ichneumon is so fatal an enemy to the crocodile; for it is no more true that he introduces himself into the mouth of that animal when asleep, than that he attacks it when awake.

The ichneumon exercises much perseverance in obtaining his prey. He is seen to remain for hours in the same place, watching for the animal he has seen there, and which he endeavours to obtain. This quality makes him a valuable substitute for the cat, in cleaning a house of the parasitical little animals that infest it, and he is for this reason domesticated. He is much attached, in a domestic state, to the house he inhabits, and remains affectionate and submissive to those who have brought him up. He does not ramble, and has no temptation to return to his wild state; but, when lost, he seeks the persons he has often seen, whose voices he recognizes, and whose caresses he loves. But this gentle creature loses much of his mildness when he eats. He then seeks out some secret retreat and manifests great choler if he sees any cause to fear being deprived of his prey. When he penetrates to a place which is unknown to him, he immediately explores it in every part, chiefly by his sense of smell, which of all his organs seems the most active and delicate, on which he appears to rely the most, and which seems in some measure to compensate for the feebleness of the others: for his sight, his taste, and his feeling do not present anything remarkable, only his external ear has a great breadth and extent of orifice.

The ichneumon is of a brown colour, speckled with dirty white,—that is to say, that each hair has brown and white rings. The hairs are very short and the rings very small upon the head and the extremity of the members, which gives to these parts a deeper tint than the others. The white rings are larger, and the hairs are longer upon the back and the tail. Upon the flanks and under the belly the hairs become still longer, and the tint is paler than on the other parts. The tail is terminated by a tuft of very long black hairs, which contrast strongly with the fawn-brown of the rest of the body. The hair of the ichneumon is more thick, dry, and weak than in any other animal of the same genera. The length of the body, from the ears to the root of the tail, is one foot; the length of the head, from the back of the ears to the muzzle, is about three inches and a half; the length of the tail is one foot four inches; and the height of the most elevated part of the back is seven inches.

Naturalists have been long acquainted with the ichneumon, but rather by character than figure. Figures were given by Belon, Gesner, Aldrovande and others, but they did not sufficiently distinguish the ichneumon from other animals of the same genera. Even Buffon mistook the Mangouste for it, to which he has applied all the descriptions concerning the ichneumon.

This animal has not yet a well-determined name in the methodical catalogues, different naturalists continuing to call it by different names. The name ichneumon, which is Greek, was first employed by Herodotus, and is indicative of the habits of the animal.



[Ichneumons.]

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.
LONDON:—CHARLES KNIGHT, 22, LUDGATE STREET, AND 13, PALL-MALL EAST.
Printed by WILLIAM CLOWES, Duke Street, Lambeth.